Surface Water Management Systems Plan

For

Florida Power Development & CEMEX Certified Facility

Prepared by

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I. Surface Water Management Systems Plan Objective

The objectives of the SWMSP are to 1) define routing of process and stormwater, 2) assess the potential for causing surface or ground water pollution, and 3) assess and implement practices and procedures to minimize pollutants in the discharges, thus reaching the surface water features onsite.

The certified facility does not discharge to "surface waters of the State". The cooling ponds are manmade, used for cooling purposes, and are hydrologically closed, therefore do not meet the definition of a surface water of the State. Furthermore, based on historical and current operations and analytical data, the certified facility does not discharge a contaminant load to the surface water features that threatens public health and the environment. All water goes to the ponds, and none is released off site.

II. Process Water, Stormwater, and Wastewater Routing

The following are the process water, stormwater, and wastewater descriptions.

Coal Fuel Yard Stormwater- The CEMEX coal storage area, including a runoff collection sump, is underlain by a very low permeability clay liner. The runoff collection sump in the west end of the storage area was designed to contain the 100-storm. Any additional stormwater exceeding the sump's holding capacity is pumped to the perimeter ditch.

Biomass Fuel Yard Stormwater - The FPD biomass fuel yard runoff is contained within the designed retention basin and does not discharge into the perimeter ditch or the cooling ponds.

Plants Stormwater – Stormwater from the FPD biomass power plant and the CEMEX cement plant area discharges to the perimeter ditch, then is pumped to the cooling ponds, from which, water is reused at the biomass power plant for cooling equipment purposes. The water in the multiple ponds is reused, evaporated, or percolated into the ground. Rainwater that falls on the cooling ponds also adds to the cooling ponds volume. There is no surface discharge from these cooling ponds, except under extreme storm conditions, and even then, no offsite discharge occurs.

Sanitary Wastewater - The sanitary wastewater from the FPD biomass power plant and from the CEMEX cement plant/admin areas, is routed to the onsite Domestic Wastewater Treatment Plant. The treated wastewater from the Domestic Wastewater Treatment Plant is routed via perimeter ditch and pumped to cooling pond 5. CEMEX cement warehouse/machine areas sanitary wastewater is routed to a designated septic tank. It is periodically pumped out by license contractor and disposed offsite.

Truck Wash Wastewater – the truck wash wastewater is routed to the perimeter ditch, however due to minimal and intermittent amount it may not flow to the cooling ponds. It has no effect on cooling pond quantity or quality.

FPD Biomass Power Plant Water and Wastewater – FPD uses well water for several plant systems, and each system has an associated wastewater discharge. These include the boiler unit, plant service water, and domestic sanitary system. The water used in the boiler unit must be pretreated prior to use to obtain the quality needed to generate the high purity steam. The pretreatment system consists of Reverse Osmosis (RO) Units and Demineralizer Units. The wastewater from the pretreatment equipment consists of RO reject, which is routed to the building drains and combined with other biomass power plant wastewater. The Demineralizer Units are portable units and are regenerated off site, so no demineralizer wastewater is generated at or discharged from the FPD biomass power plant to the ponds. To maintain proper boiler water quality, approximately 2% of the boiler water is blowdown. This boiler blowdown is routed to the boiler blowdown tank. Afterwards, it is routed to the building drains and combined with the other process wastewater which is routed to the perimeter ditch and then pumped to cooling pond 5.

The FPD biomass power plant uses water for various plant services, such as hose connections and the fire water system. All drains are routed to the perimeter ditch and pumped to cooling pond 5.

The cooling water is used to cool various FPD biomass power plant equipment, including but not limited to the water cooled grate ash system, the steam condenser system, and various pumps, using non-contact heat transfer properties. The warmed (or spent) cooling water is routed to the perimeter ditch and discharged into cooling pond 5 to be commingled and circulated through the two cooling ponds. When the biomass power plant is running, cooling water is withdrawn from cooling pond 5 through the intake structure, routed to the FPD biomass power plant and used in the circulating cooling systems, then piped to the perimeter ditch, then routed and discharged into cooling pond 5, this is done on a continuous basis.

CEMEX Plant Water and Wastewater - The manufacture of cement at the CEMEX Plant is a dry operation that does not require process water. However, the CEMEX Plant uses their permitted well water as other non-contact cooling water for various pieces of process equipment in their two cement plant kiln process lines, including but not limited to pump seal water and bearing cooling water. This spent non-contact cooling water is then routed to and discharged into the perimeter ditch and pumped to cooling pond 5.

Wastewater Flow Path

CEMEX coal storage stormwater runoff – coal pile runoff collection sump, if necessary, can be pumped to perimeter ditch and pumped to cooling ponds.

CEMEX cement plant stormwater runoff – routed to perimeter ditch and pumped to cooling pond 5.

FPD biomass yard stormwater runoff – biomass retention basin.

CEMEX cement warehouse and machine shop areas sanitary wastewater – routed to designated septic tank, periodically pumped by license contractor and disposed offsite.
FPD biomass power and CEMEX cement plant/admin areas sanitary wastewater – Domestic Wastewater Treatment Plant Effluent – routed to perimeter ditch and pumped to cooling pond 5.
Truck Wash Wastewater – perimeter ditch, minimal and intermittent volume.
FPD biomass power plant boiler blowdown and RO reject – routed to perimeter ditch and pumped to cooling pond 5.
FPD biomass power plant service wastewater – routed to perimeter ditch and pumped to cooling pond 5.
FPD biomass power plant spent non-contact cooling water – routed to perimeter ditch and pumped to cooling pond 5.
CEMEX cement plant spent non-contact cooling water (K1) – routed to perimeter ditch and pumped to cooling pond 5.
CEMEX cement plant spent non-contact cooling water (K2) – routed to perimeter ditch and pumped to cooling pond 5.

III. Sampling and Monitoring

Process wastewater - is monitored per the revised Conditions of Certification process monitoring requirements. Sample analyses are completed by a certified lab, using approved methods per 40 CFR 136. Refer to Conditions of Certification and DMR for specifics.

Perimeter Ditch

Constituents – TSS, pH, total Al, total Fe, TPH, O&G, TDS

Frequency – Annual

Cooling Water Pond 4

Constituents – pH, TSS, Water Level

Frequency – Semi-Annual

Reuse Wastewater (R001, To Ponds)

Constituents – Flow, BOD, TSS, Fecal Coliform, pH, total Cl, total Nitrate

Frequency – 2 days/week and/or monthly

Groundwater – has been monitored since the mid-1980. Groundwater is monitored per the revised Conditions of Certification groundwater monitoring requirements. Sample analyses are completed by a certified lab using approved methods per 40 CFR 136. Refer Conditions of Certification and DMR for specifics.

Wells – MWC 1, 2R, 3, 4R, 5, 6, and 8R

Constituents – Water Level, pH, Specific Conductance, Turbidity, TDS

Frequency – Annual

Every 5 years, 2 selected wells monitored for Primary and Secondary drinking water parameters as noted in the Conditions of Certification.

Evaluation of Data – Historical and current data has been reviewed and evaluated. Constituents determined to be non-detector extremely low have been removed from the monitoring list and/or the frequency of monitoring has been reduced. On an annual basis, the data obtained from the analysis will be reviewed and evaluated to determine if issues exists and if procedures or practices require modifications.

Wastewater Treatment Plant Influent and Effluent - is monitored per the revised Conditions of Certification requirements. WWTP is operated by certified personnel. Sample analyses are completed by a certified lab using approved methods per 40 CFR 136. Refer to Conditions of Certification and DMR for specifics.

Wastewater Influent (To WWT Plant)

Constituents – Flow, BOD, TSS

Frequency – Monthly, Annual, Annual

Wastewater Effluent (From WWT Plant, To Ponds)

Part of R001 wastewater stream

Constituents of Concern – Constituents noted above can originate from processes and/or materials found at the certified facility that could have the potential to mix with and discharge routed to the surface water features (cooling ponds) and enter groundwater. Evaluation of the analytical data identified these constituents could potentially affect surface water and groundwater quality in the onsite water features, so they will continue to be monitored.

IV. Containment Integrity for Dams and Berms

Conduct dam and berm inspections according to State requirements on an annual basis by an engineer registered in the State of Florida and experienced in the field of construction and maintenance of dams. Results of inspections are kept on file. Perform weekly cursory inspections of the dams and their applicable features by qualified personnel and prepares a monthly report regarding findings. The monthly reports and annual reports are filed at the plant office.

The intent of these inspections is to establish regular evaluation and an inspection record in order to minimize the risk of spills, releases, and discharges from settling pond and cooling pond storage features at the certified facility.

Inspection Schedule:

- Annual Dam Safety Inspection by professional engineer registered in State of Florida.
- Cursory weekly Dam Inspection with a monthly report conducted by plant personnel.
- Inspection Reports are filed

V. General Operating Procedures

Maintenance and Housekeeping – Good housekeeping is essential to the proper maintenance of the work place and is emphasized throughout the certified facility. Employees are provided initial and annual refresher training that addresses the importance of good housekeeping. Regular schedules and assignments are developed by area supervisors to ensure safe and clean working conditions.
General housekeeping at each operation and adjacent property areas is the responsibility of the respective operations and maintenance departments. Spilled process material on the plant roads is cleaned upon occurrence as soon as practicable.

Record Keeping – All certified facility personnel are trained in proper record keeping requirements for their specific job functions as applicable. Each of the operating areas have operational record keeping requirements for the certified facility or operations addressed in the documents.

Inspections – All certified facility personnel are trained to observe their surroundings during the course of their daily duties and to report anything that may contribute to releases of potentially harmful materials. Operating plans and permits have an inspection component and record keeping requirement.

Plant Security – All access into and out of the certified facility is monitored and recorded by the facility security guard. The security guard is responsible for insuring that all outside contractors, consultants, and regulatory personnel are appropriately logged in and recorded. In addition, the security guard checks any outside contractor vehicles to insure that proper documentation is provided for all materials being brought into the certified facility, and that all loads are properly documented and restrained on the vehicle.

Employee Training – All new employees receive initial training that covers chemical hazards, SDS manuals, the Health and Safety Procedures, Emergency Procedures, and Environmental Procedures.

Employees routinely receive annual training covering health, safety, environmental programs, permits and compliance, employee responsibilities, identification of environmental incidents, management and reporting of chemical and petroleum spills, waste management, dams and dikes inspections, and stormwater control. In addition, the training program informs all personnel of the components and goals of the SWMS Plan. All training sessions are properly documented with the name of the trainer, the names of the participants, the date the training was performed and the subject matter.

Safety Data Sheets (SDS) – SDS forms for all chemicals utilized in the certified facility are maintained by the facility safety staff. The safety staff ensures that updated versions of the SDS's are available in various areas of the certified facility. Operation manuals and protocols involving the use of chemicals specifically referenced the SDS forms. SDS forms are available to all employees for reference prior to handling any chemical in the certified facility.

Emergency Procedure Management – Specific emergency procedures have been developed and implemented that provide a basic plan of action to be followed in the event of a major facility emergency, which may include the following: 1) fire, 2) explosion, 3) rupture and/or release of substances such as fuel or gasoline, 4) equipment, building, or structure failure, 5) natural causes such as hurricanes, tornadoes, and severe thunderstorms, and 6) sabotage or bomb threats. The manual includes requirements and procedures for responding to sudden and non-sudden spills (petroleum spills, chemical spills, truck spills, and settling/cooling water releases).

VI. Best Management Practices

The objective is to implement best management practices to prevent or minimize the potential for the release of pollutants to water from ancillary activities through plant site runoff, spillage or leaks, and/or drainage from raw material storage. Ancillary activities are defined as material storage areas, in-plant transfer, process and material handling areas, and loading and unloading operations.

SPCC Plan – There are pollutants that could result from materials utilized at the certified facility that normally do not discharge to surface water features such as the perimeter ditch. These pollutants are gasoline, diesel, fuel oil, oils, lubricants, and used oil. These materials are address in the Spill Prevention Control and Countermeasure Plan. Solvents and other chemicals used for operations in small amounts are closely monitored, and they are handled in accordance with their respective SDS requirements and plant procedures. However, it should be noted that the SPCC Plan is not officially required, since ponds are hydrologically closed to navigable waters, therefore it is implemented as a BMP.

Solid Waste and Industrial By-Product Raw Materials – Solid waste and industrial by-product raw materials accepted at the certified facility for use in production shall not be hazardous

waste as defined in 40 CFR 261. Such raw materials, including any industrial by-products will be managed in such a way so as to provide reasonable assurance that there will be no contamination of the soil, sediment, surface and/or groundwater in violation of the FDEP water quality standards or minimum criteria.

Solid waste and industrial by-products generated from the certified facility will be handled, stored, and managed as required based on the waste determination performed per 40 CFR 261, including processor knowledge. All of the operating entities will maintain their respective operations adequate and appropriate records to document the determinations.

Debris Removal – Spillway and other stormwater control and conveyance structures require frequent debris removal to maintain proper function. Litter and wastes can clog inlets, catch basins and outlets, and lead to overflows, erosion and unintended flooding. Grates on process water inlets and outlets must be cleaned on a regular basis. Certified facility personnel inspect all spillway and stormwater control and conveyance structures to maintain proper function on a weekly basis. When necessary, debris is removed and properly disposed of in accordance with permitted and regulatory requirements. Certified facility personnel have also established an ongoing mowing contract, which includes mowing and weed control of all conveyance structures. Curbing and the use of silt fencing will be used as needed to control unwanted sediment discharge.

Waste Minimization Assessment – Waste minimization is a component of pollution prevention. Periodic assessments are designed to improve processes that include source reduction, waste minimization and on-site recycling to the greatest extent practicable. The objective is to reduce or eliminate certain material(s) that are a potential source of pollution. The waste reduction examples include: Evaluating materials that are purchased and used for reduction or elimination or evaluate and use where feasible substitution of petroleum based (solvent) general-purpose cleaners with either aqueous alkaline based or citrus-based cleaners.

Education Program – Education programs are effective nonstructural BMPs when implemented for all employees. Employees and supervisors will adapt to new methods or use alternative materials when they are informed of workable techniques during classroom instructions.

Preventive Measures – Source controls management techniques that reduce the exposure of materials to stormwater will be given additional emphasis. Since the certified facility's runoff does not represent a threat to onsite waters, these BMPs are oriented toward actions that are focused on materials handling techniques. Most measures that mitigate existing water quality conditions are preventive in nature. These practices use alternative maintenance procedures, education of management and technical personnel, or redesign of structures to reduce the amounts of constituents entering stormwater and accumulating on impervious areas. Preventive measures are cost-effective ways to manage stormwater runoff

because they usually require no land area or construction and can be implemented quickly and economically.

Exposure Reduction – The most effective way to reduce or eliminate constituent loading in stormwater is to limit the exposure of materials to rainfall and runoff. Covering storage areas help reduce its transport to the stormwater conveyance systems and thus into the onsite water features.

Minimization of Pollutants – Overall, significant stormwater affects will be avoided by removing potential pollutants from the watershed, using alternative chemicals, using alternative practices, recycling or reducing the use of polluting chemicals and other materials. The certified facility managers are in the best position to devise alternative and innovated procedures and new techniques that avoid or reduce pollutants, and can be given guidance, incentives, and though-provoking encouragement to do so.

Water Conservation Measures – The certified facility incorporates a very large water recirculating system. Groundwater, from production wells is used for cooling various types of equipment. Upon cooling, the water is recirculated back into the recirculating perimeter ditch, where it is pumped to and mixed in Ponds 4 and 5 with rainwater and treated effluent from the wastewater treatment plant, then re-pumped to the certified facility to cool equipment once again. There is no significant loss of water, with the exception of losses associated with evaporation and natural soil percolation.

Certified facility personnel regularly inspect the equipment to ensure that it is operating properly. Broken and/or leaking equipment is quickly fixed to prevent an environmental issue and to reduce unnecessary loss of water. Pressure cleaning is periodically conducted as needed. Low flow toilets and other water saving fixtures are in use throughout the certified facility. Broken toilets and fixtures are replaced regularly with water saving units. Irrigation for grass and landscaping is not conducted.

Sediment and Erosion Control – The proper sediment and erosion control practices is integral to preservation of water quality within the facility's retention ponds and conveyance systems. General control practices include removing buildup of debris from heavy vegetation or other yard debris that may restrict flow in the water-conveyance system. Dispose of chemicals, oils, greases or similar wastes at approved disposal or recycling facilities and not in drains directly affecting site water conveyance systems. Limiting as practical, the amount of fertilizers around and in the ponds. Avoid herbicides on the banks of the ponds to protect the bank slopes from erosion and sediment buildup. Re-sod any areas where grass or sod has been removed or eroded which protect the banks of the ponds. Periodically, remove and properly dispose sediment that accumulate in the water conveyance systems. During repair or maintenance activity, caution will be used to avoid erosion or siltation. Alterations requiring proper permitting or approval from applicable regulatory agencies will be completed. Repair any non-

functional baffles, deteriorating structures and any sink holes. Repair any sinkholes as practical, according to attached plan (Figure 1) or per vendor recommended industry standard repair plan.

Periodic inspections include:

- Visual observations for bank instability from erosion,
- Evidence of sinkholes, sod condition (any distress of vegetation),
- Presence of waste, debris or pollutants within surface water systems,
- Inspection of cracks, structure failure or non-functioning baffles and
- Operable staff gages for indication of sediment accumulation and water level.

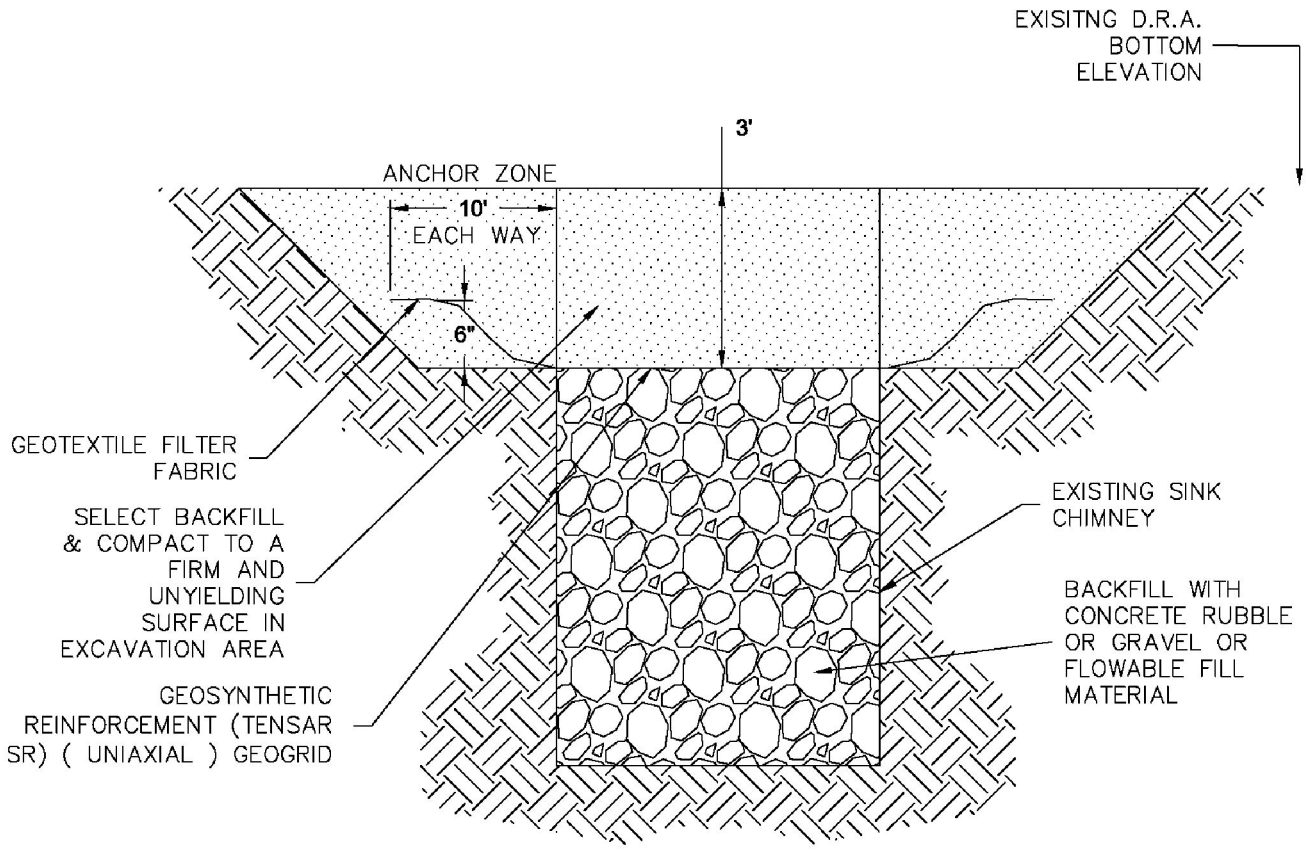
Inspection and maintenance records are maintained on site.

Continuous Improvement – As part of everyday operations and maintenance, the certified facility personnel are always looking for ways to improve their daily tasks, conserve resources and lessen impacts to the environment. Additionally, they share lessons learned as well as best practices. Furthermore, management encourages a questioning attitude, and everyone is expected to "stop a task" if they perceive it to be unsafe or could cause an impacts to the environment. This empowerment allows for tasks to be performed safely, compliantly, and creates a culture of continuous improvement.

VII. Annual Summary Report

As part of maintaining water level and water quality monitoring required in the Conditions of Certification, an Annual Summary Report is prepared and submitted by March 1 every year. The Annual Summary Report describes changes and trends in Cooling Pond 4 water levels, groundwater monitoring water levels, Cooling Pond 4 water quality date, and groundwater monitoring water quality data. Also included is a brief text describing the current conditions and includes appropriate water level and water quality tables and graphs.

Figure 1



SINKHOLE REPAIR PLAN

RECOMMENDATION FOR REPAIRING SINKHOLES IN RETENTION PONDS:
BY DEVO SEEREERAM PHD., P.E.

STEP #1:
IF THE SINKHOLE CONSISTS ONLY OF A SURFACE DEPRESSION (I.E. NO OPEN FISSURE OR EXPOSED CAVERN), PROCEED TO STEP #3.

STEP #2:
IF THE SINKHOLE HAS AN OPEN FISSURE OR EXPOSED CAVERN, FILL THE SINKHOLE TO WITHIN 3 FEET OF PLAN GRADE WITH EITHER: A) CONCRETE RUBBLE OR GRAVEL, OR B) FLOWABLE FILL. IF CONCRETE RUBBLE OR GRAVEL IS USED IT SHOULD CONSIST OF HARD, DURABLE STONE, BROKEN CONCRETE AND/OR BROKEN CONCRETE BLOCK. MATERIAL ACCEPTANCE MAY BE BASED ON VISUAL INSPECTION. THE MOST IMPORTANT MATERIAL CHARACTERISTICS ARE THAT THE CONCRETE/STONE PIECES BE DURABLE (I.E. NOT SOFT AND DISSOLVABLE), SOMEWHAT ANGULAR, AND PREDOMINANTLY COARSER THAN A 1-1/2 INCH SIEVE.

STEP #3:
PLACE TWO LAYERS OF GEOSYNTHETIC REINFORCEMENT, AND ONE LAYER OF GEOTEXTILE FABRIC, IF REQUIRED, AS FOLLOWS:

MATERIAL: THE REINFORCEMENT TO BE USED SHOULD HAVE A MINIMUM TENSILE STRENGTH OF 1,350 LB/FT (ASTM D-4595) AT A STRAIN OF 10% OR LESS. IF THE REINFORCEMENT HAS AN APPARENT OPENING SIZE (AOS) LESS THAN 70, PLACE A LAYER OF TYPE D-3 (FDOT STANDARD INDEX 199) GEOTEXTILE FABRIC WITH AOS >70 OVER THE REINFORCEMENT LAYERS.

EXCAVATION: EXCAVATE TO A DEPTH OF APPROXIMATELY 3 FEET BELOW THE POND BOTTOM, AND TO A PLAN AREA WHICH ALLOWS FOR A REINFORCEMENT/FABRIC INSTALLATION THAT EXTENDS/PROVIDES COVERAGE TO AT LEAST 10 FEET BEYOND THE SURFACE OPENING OF THE SINKHOLE, BUT DOES NOT INTERFERE WITH EXISTING TRAVEL LANES.

PLACEMENT: PLACE THE GEOSYNTHETIC REINFORCEMENT LAYERS 3 FEET BELOW THE POND BOTTOM, WITHIN THE ABOVE DESCRIBED EXCAVATION. IF THE REINFORCEMENT HAS AN AOS LESS THAN 70, PLACE A LAYER OF ABOVE DESCRIBED GEOTEXTILE FABRIC OVER THE REINFORCEMENT LAYERS. ANCHOR THE TWO REINFORCEMENT LAYERS (AND THE FABRIC, IF INSTALLED) AT LEAST 10 FEET BEYOND THE LIMITS OF THE FISSURE/CAVERN OPENING. IN THE 10 FOOT ANCHOR ZONE AREA, THE TWO REINFORCEMENT LAYERS SHOULD BE SEPARATED BY AT LEAST 6 INCHES OF SOIL. IN THE NON-ANCHOR ZONE AREA, THE UPPER REINFORCEMENT LAYER MAY BE LAID DIRECTLY ON THE UNDERLYING LAYER. STAGGER THE TWO REINFORCEMENT LAYERS SO THE JOINTS DO NOT COINCIDE. FILL THE UPPER 3 FEET OF THE EXCAVATION/SINKHOLE TO GRADE USING SELECT BACKFILL, AND COMPACT TO A FIRM AND UNYIELDING SURFACE.

REFERENCES

SINKHOLE REPAIR PLAN: CRYSTAL ENGINEERING CORPORATION, 2008

REV.	DATE	DES	REVISION DESCRIPTION	GIS	CHK	RVW

PROJECT

FPD BIOMASS CONVERSION PROJECT

TITLE

SINKHOLE REPAIR PLAN

Golder Associates
Tampa, Florida

PROJECT No. 113-89534			FILE No. 113-89534B008	
DESIGN	JDG	09/20/2011	SCALE: AS SHOWN	REV. 0
GIS	JDG	09/20/2011	FIGURE 1	
CHECK	MHS	09/20/2011		
REVIEW				

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